REMARKS

[0001] The following paragraphs are numbered for ease of future reference. Claims 1-2, 4-11,

13-17, 19-24 and 26-27 are all the claims presently pending in this application. Claims 1, 7-8, 15

and 21 have been amended to more particularly define the claimed invention.

[0002] Applicant further respectfully submits that no new matter is added to the currently

amended claims. Applicant respectfully traverses the rejections based on the following

discussion. Applicant provided the following support from Applicant's specification for the

current claim amendments, for example, to independent claim 1, to overcome the Examiner's

claims objections and 35 U.S.C. § 112, second paragraph rejections.

Applicant's Independent Claim 1	*Applicant's Exemplary Specification Support*
1. (Currently Amended) A computer-implemented method for determining a production plan comprising:	
receiving customer demands for resources from different customers;	[0019] Many factors are used to determine the relative importance of the variety of customer demands that are serviced by a manufacturing firm (e.g. gross margin, strategic importance, forecast vs. committed orders, demand mix considerations etc.)....
rank ordering, by a computing device, said customer demands to create prioritized customer demands;	[0019]... Typically, the implementation of supply-chain planning methods requires that these be translated into a "demand priority" (e.g. 1, 2, 3, ...) so that the many customer demands (measured in tens of thousands for division central runs) can be rank ordered according to importance.
aggregating, by said computing device, said prioritized customer demands into a plurality of priority groups based on said rank ordering of said customer demands;	[0079]... The inventive approach, on the other hand, is a method based on aggregating demand priorities into groups, in which each group corresponds to an LP run.
optimizing, by said computing device, a first mathematical linear programming model based on processing a highest priority group of said plurality of priority groups;	[0140]... In item 600, the invention aggregates the demand priorities into different priority groups. In item 602, the invention allocates the resources to the highest priority group of demand priorities using a first linear programming model.

Applicant's Independent Claim 1	*Applicant's Exemplary Specification Support*
assigning, by said computing device, a portion of said resources to said highest priority group of said plurality of priority groups based on said optimizing said first mathematical linear programming model;	[0140]… In item 600, the invention aggregates the demand priorities into different priority groups. In item 602, the invention allocates the resources to the highest priority group of demand priorities using a first linear programming model.
determining, by said computing device, each iterative solution for remaining ones of said plurality of priority groups in order of said rank ordering of said customer demands using results from a previous mathematical linear programming model solution;	[0140]… Next, in decision block 604, the invention determines if there are additional groups of priority demands to process. If so, the invention modifies the linear program to create a second linear programming model as shown in item 606.
assigning, by said computing device, remaining resources to a next highest priority group of said plurality of priority groups based on said determining each iterative solution;	[0140]… Then processing returns to item 602 where the invention allocates remaining resources to the next highest priority group of demand priorities using a second linear programming model.
outputting, by said computing device, said production plan based on said assigning resources;	[0140] The second linear programming model uses results from the first linear programming model. The invention continues this process by iteratively repeating the process of allocating remaining resources to the remaining groups of demand priorities in order of priority. After all groups are processed (or there are no resources remaining) this portion of the process is complete 608.
independently determining, by said computing device, backorder costs penalties for each of said plurality of priority groups using said computing device; and	[0079]… The invention generates backorder cost penalties associated with demand priorities within a group to model the consideration of multiple demand classes within a demand class group in the LP model. [0080] …Within each group of demand priorities, the backorder penalties comprise a full spectrum range of objective function penalties. Thus, each successive linear programming model allocates a full range of backorder costs within the priority group to which the resources are currently being allocated to avoid the foregoing problem.
assigning, by said computing device, by each successive mathematical linear programming model, a range of said backorder costs within a priority group of said plurality of priority groups to which resources are currently being assigned.	[0140]… The invention continues this process by iteratively repeating the process of allocating remaining resources to the remaining groups of demand priorities in order of priority. After all groups are processed (or there are no resources remaining) this portion

Applicant's Independent Claim 1	Applicant's Exemplary Specification Support
	of the process is complete 608.

I.   OBJECTION TO THE CLAIMS

[0003] Claims 1, 7-10, 15-16, 21 and 23 are objected to due to informalities and Applicant has

amended the claims in a manner believed fully responsive to all points raised by the Examiner.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this

rejection. Applicant respectfully requests that the Examiner consider the above paragraph

regarding Applicant's Specification support for the included amendments to the claims.

[0004] With respect to Applicant's claims 1 and 15, Applicant has now amended the claims to

recite, "receiving customer demands for resources from different customers," "rank ordering, by

a computing device, said customer demands to create prioritized customer demands,"

aggregating, by said computing device, said prioritized customer demands into a plurality of

priority groups based on said rank ordering of said customer demands," and "optimizing, by said

computing device, a first mathematical linear programming model based on processing a highest

priority group of said plurality of priority groups," to address the Examiner's concerns.

[0005] With respect to claims 7 and 8, Applicant has now amended claim 7, and likewise claim

8, to recite, "*wherein said assigning process solves said mathematical linear programs for*

higher prioritized customer demands before solving said mathematical linear programs for

lower prioritized customer demands." Applicant respectfully requests that the Examiner

withdraw this objection.

[0006] With respect to claims 10, 16 and 23, Applicant supplied the Examiner with Specification

support for Applicant's claimed invention of, "*wherein each different linear programming model*

uses as an initial constraint a program solution of the previous linear programming model," as

paragraph [0130] states, "Step 5: Add a new constraint set to the current LP model enforcing that

B_{m,j,k,q} variables in group i are lower bounded based on the current LP solution from Step

4." Applicant respectfully requests that the Examiner withdraw this objection.

[0007] With respect to claim 21, Applicant has now amended the claims to recite, "receiving

customer demands for resources from different customers," "rank ordering said customer

demands to create prioritized customer demands," and "aggregating said prioritized customer

demands into a plurality of priority groups based on said rank ordering of said customer

demands." Applicant respectfully requests that the Examiner withdraw this objection.

II.   REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

[0008] Claims 1, 5, 7-8, 10, 15-16, 21 and 23 are rejected under 35 U.S.C. §112, second

paragraph, as being indefinite. Claims 1, 5, 7-8, 10, 15-16, 21 and 23 have been amended in a

manner believed fully responsive to all points raised by the Examiner. In view of the foregoing,

the Examiner is respectfully requested to reconsider and withdraw this rejection.

[0009] With respect to claims 1, 7, 8, 15 and 21, Applicant has amended the claims to overcome

the Examiner's rejection, in particular to the "allocation," the claim language now states,

"assigning, …a portion of said resources to said highest priority group of said plurality of

priority groups based on said optimizing said first mathematical linear programming model."

Applicant respectfully requests that the Examiner withdraw this rejection.

[0010] With respect to claim 5, Applicant has amended the claim to recite, "further comprising

adding constraints to said mathematical linear programming models at each iteration ensure a

feasible starting solution for re-optimizing said mathematical linear programming models.

Support for this amendment in the Specification may be found, for example, at paragraph [0138],

that states, "Thus, the constraints added in Step 5 are disaggregated. The previous (aggregated)

solution can be used to provide a feasible starting solution for reoptimizing the LP with the

additional disaggregated constraints." Applicant respectfully requests that the Examiner

withdraw this rejection.

[0011] With respect to claim 10, 16 and 23, Applicant refers the Examiner to the above

recitation of Applicant's Specification. Applicant respectfully requests that the Examiner

withdraw this rejection.

III.   THE PRIOR ART REJECTIONS

    A.   The 35 U.S.C. § 103(a) Rejection over Hegde further in view of Nagarur

[0012] Claims 1-2 and 5-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over

Hegde, et al., U.S. Pat. No. 7197469, (hereinafter "Hegde"), further in view of Nagarur, et al.,

"Production planning and scheduling for injection moulding of pipe fittings: A case study",

(hereinafter "Nagarur").

[0013] The Examiner alleges that one of ordinary skill in the art would have been motivated to

modify Hegde with the teaching from Nagarur to form the invention of claims 1-2 and 5-6.

Applicant submits, however that these references would not have been combined and even if

combined, the combination would not teach or suggest each element of the claimed invention.

[0014] Applicant traverses the Examiner's rejection since, among other reasons, Hegde is

directed toward dividing each of a priority ranked scheduled releases (Material Requirements

Planning (MRP)) into "N" separate and smaller sized scheduled releases where the priority of

each of the "N" releases may be equal to the priority of the original release. The "N" separate

and smaller sized scheduled releases are sorted according to priority and then used to determine

an optimal supply schedule for allocating resources including component supply and assembly capacity.

[0015] Meanwhile, Applicant's claimed invention is directed toward independently determining backorder costs penalties for each of a plurality of priority groups, and assigning by successive mathematical linear programming models, a range of said backorder costs within a priority group of the plurality of priority groups to which resources are currently being assigned.

[0016] More specifically, Applicant submits, that neither Hegde, nor Nagarur, nor any alleged combination thereof, teaches or suggests,

"*independently determining, by said computing device, backorder costs penalties for each of said plurality of priority groups using said computing device*," and

"*assigning, by said computing device, by each successive mathematical linear programming model, a range of said backorder costs within a priority group of said plurality of priority groups to which resources are currently being assigned*," per Applicant's claimed invention of claim 1.

[0017] The Examiner on page 7 of the After-Final Office Action admits that "Hedge does not teach that such [priority] groups are assigned backorder costs per se," but the Examiner alleges that, "Hedge [5,5] does describe costs for backordering and the need to match assets with demand -[2,17]-, and the rationing of resources among competing demands -[1,25])."

[0018] However, the Examiner has failed to address Applicant's specific claim limitations of "*independently determining...backorder costs penalties for each of said plurality of priority groups*," and "*assigning...by each successive mathematical linear programming model, a range of said backorder costs within a priority group of said plurality of priority groups to which resources are currently being assigned*," and as such, the Examiner admits that Hedge fails to

teach or suggest anything regarding backorder costs penalties <u>determined and assigned to a</u> <u>specific priority group to which resources are currently being assigned</u>. Alternatively stated, nowhere in Hedge is there any teaching or suggestion where "a priority ranked release schedule" is assigned a range of backorder costs where resources are currently being assigned by *each* *successive mathematical linear programming model*.

[0019] On page 8 of the After-Final Office Action, the Examiner admits that, "Hegde does not specifically teach use of successive linear programming models, per se, or that each iterative solution uses results from a previous mathematical linear program solution," and further alleges that "Nagarur [abstract] refers to a sequence of sub-problems involving use of linear programming methods. Nagarur [p.162, col. 2] further states "Establish the equivalent linear programming model for this priority level k. All the solutions obtained from previous steps are included as additional constraints."

[0020] However, even assuming *arguendo* that the Examiner's position has some merit, Nagarur fails to teach or suggest, "*independently determining...backorder costs penalties <u>for each of said</u>* <u>*plurality of priority groups*</u>," and "<u>*assigning...by each successive mathematical linear*</u> <u>*programming model, a range of said backorder costs within a priority group of said plurality of*</u> <u>*priority groups to which resources are currently being assigned*</u>," per Applicant's independent claim 1. Therefore, Nagarur fails to overcome the deficiencies of Hegde.

[0021] In summary, Hegde is directed toward dividing each of a priority ranked scheduled releases (Material Requirements Planning (MRP)) into "N" separate and smaller sized scheduled releases where the priority of each of the "N" releases may be equal to the priority of the original release. The "N" separate and smaller sized scheduled releases are sorted according to priority and then used to determine an optimal supply schedule for allocating resources including

component supply and assembly capacity. Meanwhile, Applicant's claimed invention is directed

toward independently determining backorder costs penalties for each of a plurality of priority

groups, and assigning by successive mathematical linear programming models, a range of said

backorder costs within a priority group of the plurality of priority groups to which resources are

currently being assigned.

[0022] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this

rejection since the alleged prior art references to Hegde and Nagarur (either alone or in

combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

B.   The 35 U.S.C. § 103(a) Rejection over Hegde further in view of Nagarur and Hung

[0023] Claims 8-9, 15 and 21-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable

over Hegde, (hereinafter "Hegde"), further in view of Nagarur and Hung, et al., "A Production

Planning Methodology for Semiconductor Manufacturing Based on Iterative Simulation and

Linear Programming Calculations.", (hereinafter "Nagarur and Hung").

[0024] The Examiner alleges that one of ordinary skill in the art would have been motivated to

modify Hegde with the teaching from Nagarur and Hung to form the invention of claims 8-9, 15

and 21-22. Applicant submits, however that these references would not have been combined and

even if combined, the combination would not teach or suggest each element of the claimed

invention.

[0025] Applicant traverses the Examiner's rejection since, among other reasons, Hegde is

directed toward dividing each of a priority ranked scheduled releases (Material Requirements

Planning (MRP)) into "N" separate and smaller sized scheduled releases where the priority of

each of the "N" releases may be equal to the priority of the original release. The "N" separate

and smaller sized scheduled releases are sorted according to priority and then used to determine

an optimal supply schedule for allocating resources including component supply and assembly

capacity.

[0026] Meanwhile, Applicant's claimed invention is directed toward independently determining

backorder costs penalties for each of a plurality of priority groups, and assigning by successive

mathematical linear programming models, a range of said backorder costs within a priority group

of the plurality of priority groups to which resources are currently being assigned.

[0027] More specifically, Applicant submits, that neither Hegde, nor Nagarur, nor any alleged

combination thereof, teaches or suggests,

> *"assigning...a portion of said resources to a highest priority group of said plurality of*

priority groups based on said optimizing said first linear programming model," and

> *"wherein during said assigning processes, each mathematical linear programming model*

assigns a range of backorder costs within the priority group of said plurality of priority groups

to which the resources are currently being assigned," per Applicant's independent claim 8, and

similarly independent claims 15 and 21.

[0028] The Examiner on page 11 of the After-Final Office Action admits that "Hedge does not

teach that such [priority] groups are assigned backorder costs per se," but the Examiner alleges

that, "Hedge [5,5] does describe costs for backordering and the need to match assets with

demand -[2,17]-, and the rationing of resources among competing demands -[1,25])."

[0029] However, the Examiner has failed to address Applicant's specific claim limitations of

"*assigning...by each successive mathematical linear programming model, a range of said*

backorder costs within a priority group of said plurality of priority groups to which resources

are currently being assigned," and as such, the Examiner admits that Hedge fails to teach or

suggest anything regarding backorder costs penalties <u>determined and assigned to a specific</u>

<u>priority group to which resources are currently being assigned</u>. Alternatively stated, nowhere in

Hedge is there any teaching or suggestion where "a priority ranked release schedule" is assigned

a range of backorder costs where resources are currently being assigned by *each successive*

mathematical linear programming model.

[0030] The Examiner on page 12 of the After-Final Office Action admits that Hedge fails to

teach or suggest, "*allocating, by said computing device, remaining resources to the next highest*

priority group of prioritized demands using a second linear programming model, wherein said

second linear programming model uses results from said first linear programming model; and

repeating said process of allocating remaining resources, by said computing device, to the

remaining groups of prioritized demands in order of priority," and alleges that "Nagarur [p.162,

col. 2] further states "Establish the equivalent linear programming model for this priority level k.

All the solutions obtained from previous steps are included as additional constraints."

[0031] The Examiner on page 12 of the After-Final Office Action further admits that Hedge fails

to teach or suggest, "aggregating, by said computing device, said prioritized demands into

different priority groups," and alleges Hung discloses at [259, col. 1] that these "demands are

divided into prioritized classes that are loaded onto front end facilities by incremental linear

programming calculations.""

[0032] However, even assuming *arguendo* that the Examiner's position has some merit, Nagarur

and Hung fails to teach or suggest, "<u>*assigning...by each successive mathematical linear*</u>

<u>*programming model, a range of said backorder costs within a priority group of said plurality of*</u>

<u>*priority groups to which resources are currently being assigned*</u>," per Applicant's independent

claim 8, and similarly, independent claims 15 and 21. Therefore, Nagarur and Hung fails to

overcome the deficiencies of Hegde.

[0033] In summary, Hegde is directed toward dividing each of a priority ranked scheduled

releases (Material Requirements Planning (MRP)) into "N" separate and smaller sized scheduled

releases where the priority of each of the "N" releases may be equal to the priority of the original

release. The "N" separate and smaller sized scheduled releases are sorted according to priority

and then used to determine an optimal supply schedule for allocating resources including

component supply and assembly capacity. Meanwhile, Applicant's claimed invention is directed

toward <u>assigning by successive mathematical linear programming models, a range of said</u>

<u>backorder costs within a priority group of the plurality of priority groups to which resources are</u>

<u>currently being assigned</u>.

[0034] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this

rejection since the alleged prior art references to Hegde and Nagarur and Hung (either alone or in

combination) fail to teach or suggest each element and feature of Applicant's claimed invention.

   C.   **The 35 U.S.C. § 103(a) Rejection over Hegde further in view of Nagarur, de
          Farias, Fakhouri and Leachman**

[0035] Claims 4, 7, 10-11, 13-14, 16-17, 19-20, 23-24 and 26-27 stand rejected under 35 U.S.C.

§103(a) as being unpatentable over Hegde, (hereinafter "Hegde"), further in view of Nagarur

further in view of de Farias, Fakhouri, U.S. Pat. No. 746147 and Leachman, (hereinafter

"Nagarur, de Farias, Fakhouri and Leachman").

[0036] The Examiner alleges that one of ordinary skill in the art would have been motivated to

modify Hegde with the teaching from Nagarur, de Farias, Fakhouri and Leachman to form the

invention of claims 4, 7, 10-11, 13-14, 16-17, 19-20, 23-24 and 26-27. Applicant submits,

however that these references would not have been combined and even if combined, the

combination would not teach or suggest each element of the claimed invention.

[0037] With respect to Applicant's claim 4, the Examiner on page 14 of the After-Final Office

Action admits that, "Hegde does not specifically teach, "said mathematical linear programs

solved in each iteration use the solution to the previous mathematical linear program as a starting

solution," but alleges Fakhouri at [36,18] discloses, "[a] scheme for performing the allocation of

various resources based on the values for the various resources in the integer solution [sic]

obtained in the previous step."

[0038] With respect to Applicant's claim 7, the Examiner on page 14 of the After-Final Office

Action admits that, Hegde does not specifically teach "said assigning process solves said

mathematical linear programs for higher prioritized customer demands before solving for lower

priorities, but alleges that Fakhouri at [5,14] states "For example, if two resources depend on a

resource that can only support one of them, then one way to resolve the conflict is to allocate the

scarce resource to the resource with higher priority."

[0039] With respect to Applicant's claims 10, 16 and 23, the Examiner admits that Hegde does

not specifically teach each different linear programming model uses as a starting point a

program solution of the previous linear programming model, but alleges that Fakhouri discloses

lower-level resource allocations.

[0040] With respect to Applicant's claims 11, 17 and 24, the Examiner admits that Hegde does

not specifically teach during said allocating processes, each linear programming model fixes

variables associated with priority groups that have a lower priority than the priority group to

which the resources are currently being allocated," but alleges that Fakhouri at [38,40-2]

"teaches fixing variables according to the solutions of previous stages."

[0041] With respect to Applicant's claims 14, 20 and 27, the Examiner admits that "Hegde, does not specifically teach said sub-priority tiers can be processed simultaneously," but the Examiner alleges that, "Fakhouri, [4,55] teaches satisfying multiple constraints simultaneously, and in [26,15] states "Tasks are defined such that (a) each task is computationally significant as to the bookkeeping costs of managing parallelism.""

[0042] However, even assuming *arguendo* that the Examiner's position has some merit, Nagarur, de Farias, Fakhouri and Leachman fails to teach or suggest, "*assigning...by each successive mathematical linear programming model, a range of said backorder costs within a priority group of said plurality of priority groups to which resources are currently being assigned*," per Applicant's independent claim 8, and similarly, independent claims 15 and 21. Therefore, Nagarur, de Farias, Fakhouri and Leachman fails to overcome the deficiencies of Hegde.

[0043] Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection since the alleged prior art references to Hegde and Nagarur, de Farias, Fakhouri and Leachman (either alone or in combination) fail to teach or suggest each element and feature of Applicant's claimed invention.
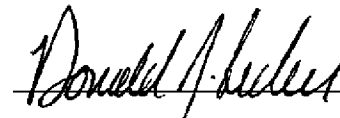
IV.   FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-2, 4-11, 13-17, 19-24 and 26-27, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a <u>telephonic interview</u>.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 09-0456.

Respectfully Submitted,

Date: <u>June 1, 2010</u>

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